

**ALL-FIBER LINEAR DESIGN DEPOLARIZER****FOR ALL-STATES OF POLARIZATION**

*This application is a National Filing pursuant to 35 U.S.C. 371 based upon International Application No. PCT/CA03/01916, filed December 9, 2003.*

**FIELD OF THE INVENTION**

This invention relates to an all-fiber depolarizer that can be used to depolarize any state of polarization (SOP) and is therefore suitable for all-SOP depolarization. It also includes a method of making such depolarizer.

**BACKGROUND OF THE INVENTION**

In a co-pending Canadian patent application No. 2,393,172 which is incorporated herein by reference, there is already disclosed an all-fiber linear design depolarizer which is, however, suitable only for depolarizing a single state of polarization.

There is clearly a need for an all-fiber, all-SOP depolarizer that would allow depolarization of light for any and all SOP.

**SUMMARY OF THE INVENTION**

The all-SOP, all-fiber depolarizer of the present invention is a combination of two polarization combiners (PC1 and PC2) with a directional coupler positioned in between, such as a 3dB 2x2 coupler. A polarization rotator means is also used to rotate the polarization; this can be a half wave component producing a polarization maintaining half wave length, such as a half wave plate, a twisted fiber, a fiber configuration using Berry's phase, an axially rotated PM fiber, or similar device. Such rotator device has a birefringence axis making  $\pi/4$  rad with the polarization combiner (PC) axis. There must also be provided optical phase delays between each polarization combiner and the coupler.